

All the data in this document is digital data represented in hexadecimal format. **During testing, all data is 16 bits!**

If the 16-bit word has its MSB set, the word is a control word. There may be a second word right after the control word that represents a count. In this document, the term “word” refers to a 16-bit value and is composed of two 8-bit bytes.

First scenario: A non-cyclic linear sweep with a deposition period

80 00 08 03 07 A5 05 E5 05 65 05 89 05 77 05 7B 05 7B 05 7A 05 7A **FF 00** **82 00 00 01** 05 7A 05 7B 05 84 05 8E 05 98 05 A3 05 AD 05 B7 05 C1 05 CB 05 D6 05 E0 05 EA 05 F5 05 FE 06 08 06 13 06 1D 06 28 06 32 06 3C 06 46 06 50 06 5A 06 65 06 6F 06 79 06 84 06 8E 06 98 06 A2 06 AC 06 B7 06 C1 06 CB 06 D5 06 DF 06 E9 06 F4 06 FE 07 09 07 13 07 1E 07 27 07 32 07 3C 07 46 07 51 07 5B 07 65 07 6F 07 79 07 84 07 8F 07 99 07 A4 07 AE 07 B8 07 C2 07 CC 07 D7 07 E1 07 EB 07 F6 08 00 08 0B 08 15 08 20 08 2A 08 35 08 3F 08 48 08 52 08 5C 08 66 08 70 08 7B 08 85 08 90 08 9A 08 A5 08 AF 08 B9 08 C4 08 CE 08 D7 08 E1 08 EB 08 F5 08 FF 09 0A 09 14 09 1E 09 29 09 34 09 3E 09 49 09 53 09 5D 09 67 09 70 09 7A 09 84 09 8E 09 99 09 A4 09 AE 09 B9 09 C3 09 CD 09 D8 09 E2 09 EC 09 F6 0A 00 0A 0A 0A 14 0A 1E 0A 29 0A 33 0A 3E 0A 48 0A 53 0A 5D 0A 67 **FF 00 FF F0**

The first red word (0x8000) is the control word marking the start of the deposition. The second red word (0xFF00) is an end block marker and is the end of the deposition. The first blue word (0x8200) is the control word indicating the start of the linear sweep. The second blue word (0x0001) is a counting word and indicates which data block this is. This number increments if there are multiple data blocks with the same control word. The third blue word (0xFF00) represents the end of the linear sweep data block. NOTE: If a linear sweep is performed and is not cyclic, there will only be one linear sweep data block. Also note the data words between the highlighted control words are the raw data captured by the device.

Second scenario: A cyclic linear sweep with 3 cycles and no deposition period

82 00 00 01 07 EB 07 8F 07 80 07 93 07 99 07 A5 07 AF 07 B8 07 C3 07 CD 07 D8 07 E2 07 EC 07 F6 08 00 08 0B 08 16 08 20 08 2B 08 35 08 3F 08 49 08 52 08 5C 08 67 **FF 00** **82 00 00 02** 08 71 08 78 08 72 08 67 08 5E 08 53 08 4A 08 40 08 36 08 2B 08 21 08 16 08 0B 08 01 07 F6 07 EC 07 E2 07 D8 07 CE 07 C3 07 B9 07 AF 07 A5 07 9B 07 90 **FF 00** **82 00 00 03** 07 86 07 7E 07 84 07 90 07 9A 07 A4 07 AF 07 B8 07 C3 07 CD 07 D7 07 E2 07 EC 07 F6 08 01 08 0B 08 15 08 20 08 2A 08 35 08 3F 08 49 08 52 08 5D 08 67 **FF 00** **82 00 00 04** 08 71 08 78 08 72 08 67 08 5E 08 53 08 4A 08 40 08 36 08 2B 08 21 08 16 08 0B 08 01 07 F6 07 EC 07 E2 07 D8 07 CE 07 C3 07 B9 07 AF 07 A5 07 9B 07 90 **FF 00** **82 00 00 05** 07 86 07 7E 07 85 07 90 07 9A 07 A5 07 AF 07 B8 07 C3 07 CD 07 D7 07 E2 07 EC 07 F6 08 01 08 0B 08 16 08 20 08 2A 08 35 08 3F 08 49 08 52 08 5D 08 67 **FF 00** **82 00 00 06** 08 71 08 78 08 72 08 67 08 5E 08 54 08 4A 08 40 08 36 08 2B 08 21 08 16 08 0B 08 01 07 F6 07 EC 07 E2 07 D8 07 CD 07 C3 07 B9 07 AF 07 A5 07 9B 07 90 **FF 00 FF F0**

There are a total of six data block in the data stream. When the test is cyclic, each of the data blocks represents a half cycle. Note that the first half of each cycle always has an odd number in its counting word and the second half cycle has an even number in its counting word. The successful end of the test

is indicated by the control word 0xFFF0. If a test is aborted before it finished, the final control word will be 0xF000.

Third scenario: A differential pulse test with a deposition period and quiet time

80 00 08 03 07 A3 05 E1 05 64 05 89 05 77 05 7B 05 7A 05 7A 05 7A FF 00 81 00 05 7A 05 7A 05 7A 05 7A
 05 7A 05 7A 05 7A 05 7A 05 7A FF 00 84 00 00 01 05 7A 05 7A 05 7A 05 7A 05 7A 05 7A 05
 7A 05 7A 05 7A FF 00 85 00 00 01 05 7A 05 7A 05 7C 05 8F 05 BD 05 EB 05 FF 05 FD 05 F8 05 F8 05 FB 05
 FB 05 FB 05 FA 05 FB FF 00 84 00 00 02 05 FB 05 FB 05 FE 06 1A 06 5D 06 A4 06 C2 06 BE 06 B6 06 B7 FF
00 85 00 00 02 06 BB 06 BC 06 BD 06 D0 06 FE 07 2D 07 40 07 3D 07 38 07 38 07 3B 07 3C 07 3B 07 3B
 07 3B FF 00 84 00 00 03 07 3B 07 3B 07 3F 07 60 07 AA 07 EF 08 06 07 FD 07 F5 07 F8 FF 00 85 00 00 03
 07 FC 07 FC 07 FD 08 12 08 43 08 71 08 82 08 7D 08 78 08 79 08 7C 08 7C 08 7C 08 7B 08 7B FF 00 84 00
00 04 08 7C 08 7C 08 7F 08 9D 08 E1 09 26 09 43 09 3F 09 37 09 38 FF 00 85 00 00 04 09 3C 09 3D 09 3E
 09 51 09 7D 09 AB 09 BF 09 BD 09 B9 09 B9 09 BC 09 BC 09 BC 09 BC FF 00 84 00 00 05 09 BC 09
 BC 09 BF 09 DB 0A 1D 0A 61 0A 80 0A 7E 0A 77 0A 78 FF 00 85 00 00 05 0A 7C 0A 7D 0A 7E 0A 90 0A BC
 0A E9 0A FE 0A FD 0A F9 0A F9 0A FB 0A FC 0A FC 0A FC 0A FC FF 00 FF 00

As before, the deposition starts with 0x8000. The quiet time period starts with 0x8100. The blocks of pre-pulse data start with 0x8400. The blocks of pulse data start with 0x8500. All data blocks end with 0xFF00. The test ends with 0xFFFF.

Setting/Getting various data

To get the settings, send the following byte:

0A

The following data block will be returned:

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00 12 41 51 53 31 02 00 02 04 01 00 00 00 14 FE 0C 00 00 00 14 01 FF 9C 00 64 0F A0 01 03 FE 0C 01 F4
00 FA 00 64 00 0A 00 0F 00 01 00 0E 00
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See the AquaSift instructions for the meaning of the various bytes in the settings data block.

To attempt to set the end voltage of the differential pulse test to 1600 millivolts, send the following command:

17 06 40

0x17 represents the binary command for setting the value. 0x0640 is the signed 16-bit representation of 1600 in hexadecimal. The response is the following:

07

Looking in the AquaSift instructions, the error code 0x07 means: Differential Pulse Voltage out of Range. This is because the end voltage + the pulse voltage are greater than 1650 millivolts.